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Fiscal Reality Mocks Reagan-Bush R&D Budget

Difficult financial prospects lie ahead for many federal research and development programs, according to an analysis by the Congressional Research Service (CRS) that details the massive realignment of R&D priorities that occurred during the Reagan Administration.

The CRS report, *Research and Development Funding: FY 1990*, is the first to sort out the confusions sown by Reagan's sloppily assembled goodbye budget, which was the starting point for Bush's cheerful message on February 9 calling for new science, education, and environment programs—unaccompanied by directions to the money to pay for them. The Congressional study also records the large imbalance between established spending priorities and current popular and political concerns about R&D as a weak component of high-tech industrial competitiveness.

Produced by the Science Policy Research Division of the CRS, which is part of the Library of Congress, the study warns that deficit-cutting pressures "could halt the growth in the FY 1990 Federal R&D budget," which begins next October 1. But even if the proposed growth of $4.3 billion survives, it continues, the leftover Reagan budget would distribute the bulk of the benefits to a handful of large-scale programs: Half for the Strategic Defense Initiative, with the rest divided among the space station, AIDS research, the Superconducting Super Collider, and the human-genome mapping project.

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Forecast of a Big PhD Shortage—P. 5

The growth of SDI is extremely improbable, given political souring on that fantastical venture, which long survived on little but Reagan's stubborn enthusiasm. But with money short all across the federal spectrum, and no champion for science yet in place in the Bush Administration or established on Capitol Hill, SDI cuts are not likely to be reassigned to needy fields of civilian R&D.

The CRS analysis notes the enormous growth in national-security R&D—up by 71 percent in real terms between FY 1981 and 1989, while federal non-defense R&D spending declined about 10 percent. In the final years of the Reagan Administration, growth in defense R&D tapered off, and Presidential support was given to a five-year doubling of the National Science Foundation budget by 1992. But, the report points out, "for the last two years, Congress has blocked such large proposed increases, and is likely to do so again."

The causes of NSF's financial disappointments were not discussed in the CRS report, but they are worth recalling, since they cast light on the current politics of science. The Foundation and the science it supports rank high in Congressional affections, but the budget-writing system on Capitol Hill directly pits NSF against a flock of other programs, including public housing, veterans care, and NASA, in an Appropriations Subcommittee in each chamber.

When money was short, the House Subcommittee, which is the more influential of the two, provided some extra for NSF, but held some back for two straight years to boost the budget of other agencies in its jurisdiction. The episode traumatically showed the leaders of science that they have no claim on reductions in defense R&D, and that their budget requests are in competition with fields remote from science.

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In Brief

Nearly six weeks after Inauguration Day, science affairs in Washington remain becalmed, with numerous positions still occupied by Reagan appointees, most officially resigned but awaiting successors. Among the top spots lacking Bush appointments: Administrator of NASA, the new post of Under Secretary of Commerce for Technology (filled on an acting basis by Ernest Ambler, due to leave at the end of March), and the dual job of White House Science Adviser and Director of the Office of Science and Technology Policy.

Creation of an Office of Scientific Integrity, under the Assistant Secretary for Health in the Department of Health and Human Services, is included in the draft of an anti-fraud bill that's supported by several key members of the House Energy and Commerce Committee, which writes legislation for NIH. The draft contains a big change from last year's harsher version, which placed the proposed office under the HHS Inspector General. NIH and its friends don't care for either version.

***Science* Editor Daniel E. Koshland Jr. declined to join a panel discussion on scientific fraud held February 21 by the DC Chapter of the National Science Writers Association. Taking part were *Nature* Editor John Maddox; Robert Rosenzweig, head of the Association of American Universities, and, as moderator, SGR Editor Greenberg. Koshland was discouraged by his AAAS handlers, who felt that his pooh-poohing of the fraud issue would be red meat for the audience. (On January 9, 1987, he editorialized that "we must recognize that 99.9999 percent [of published scientific] reports are true.") A request for a substitute from his ample staff was also turned down.**

The National Academy of Sciences is usually so hushed inside its grand entrance that wandering tourists could mistake it for a tomb. But appearances deceive. On February 17, the NAS health unit brought in an outside consultant for a staff session on stress management.

. . . Most R&D Agencies Face Tight Budget Season

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The CRS analysis, covering the 11 agencies that account for 99 percent of federal R&D spending, focuses on the Reagan budget. But, since Bush has proposed only cosmetic adjustments, that's basically the budget that's under consideration in Congress as the season begins for appropriations hearings. Following, from the CRS analysis, are the agency-by-agency highlights.

Agriculture. In real terms, overall funding for R&D by the US Department of Agriculture has been declining for several years. The final Reagan budget accelerates that trend, calling for reducing 1990 R&D spending by $6.5 million from the current figure, which would put it at $1.067 billion. The Agricultural Research Service would gain $17.8 million, for a total of $586 million, while the Cooperative State Research Service (CSRS) would lose $22 million, which would bring its budget to $295 million. Within the CSRS, funds for competitive research grants are budgeted for a 60 percent increase, to $63 million---a grow rate that Congress's conservative agriculture chiefs are unlikely to accept. In their view, the competitive program, focused on biotechnology and other advanced life sciences, is too remote from the everyday problems of farming to warrant big money.

Research and Development Funding: FY 1990 (CRS Issue Brief: IB 89040, no charge, 15 pp.), by the R&D Team, Science Policy Research Division, Michael E. Davey, Coordinator: Order from: Library of Congress, Congressional Research Service, LM-209, Washington, DC 20540; tel. 202/707-7035.

Energy. Defense-related programs dominated the R&D budget of the Department of Energy during the Reagan years, rising by a real 70 percent, while DOE's civilian programs fell approximately that amount. The 1990 budget asks for $6.5 billion in R&D, a $228-million increase over the present budget. The major shares are $2.7 billion for defense, $1.1 billion for general science, and $2.5 billion for energy-supply R&D. The growth is assigned to defense (up by $110 million) and, under general science, the Superconducting Super Collider (SSC), for which $250 million is budgeted. Of that amount for the SSC, $160 million is for starting construction---which still faces the hurdle of Congressional approval. One of the biggest losers in the proposed DOE budget is energy conservation, which would drop to $88 million, about half the present level. Congress has repeatedly thwarted past efforts at such cuts, but the result has been an impasse that's left the politically dull but economically vital field of conservation with a steady decline in real support for several years. Small but growing fast is DOE's human-genome program, for which $27 million is budgeted, an increase of 58 percent over this year.

Defense. Budgeted for 63 percent of all federal R&D spending, defense has long controlled a bundle that other R&D agencies yearn to share. (There's also substantial defense R&D in the budgets of DOE, CIA, and NASA, which together raise national security R&D to about 70 percent of the total.) But even with the great increases that it received under Reagan, the Pentagon has trimmed the "technology base" in favor of development. The CRS report notes that DOD funds for research and exploratory development declined, respectively, by 5.5 and 8.2 percent between FY 1984 and 1989, and that the budget for 1990 drops them by 2.8 and 6.3 percent.

"There is growing concern inside and outside the Pentagon," the CRS states, "that these technology base funding trends could threaten the Nation's fundamental defense strategy of offsetting numerical disadvantage with technological superiority." It's noted that "other Pentagon officials contend that the SDI program makes up for the decline"---but no one takes that seriously.

NASA. The 1990 budget contains a 22-percent increase for NASA, from $10.7 to $13.1 billion, of which $2 billion is for the space station, which shares honors with SDI as the most politically shaky ventures in the federal R&D inventory. "The space station program," says the CRS, "has generated considerable debate because of its cost (estimated R&D total through FY 1996, assuming 5 percent annual inflation, is $19 billion), and criticism that its objectives are not well defined. Although NASA eventually received $900 million of the $967 million requested for the space station in FY 1989, it was a hard-fought battle, especially in the Conference Committee, since the Senate-passed appropriation bill would have provided only $200 million while the House had approved $902 million."

Congress put a hold on $515 million of the space-station appropriation, conditioning its release on Presidential approval, which Bush bestowed in his February 9 budget message. That unusual legislative step reflected broad legislative doubts about the wisdom of proceeding with the gold-plated celestial motel, for which no purpose has been found. Few of the legislators, however, were willing to take

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. . . NSF Faces Scrutiny on Support of Education

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the rap for killing it, and therefore copped out by giving the next President a whack at it. Since Bush has not obliged, the fate of the space station reverts to Congress. Its courage quotient has not expanded in the meantime, but the deficit pressures have, which means that the huge increase sought for the space station becomes all the more oppressive for other programs.

National Science Foundation. The main issues here are makeup increases to get back on schedule for doubling the budget by 1992, and the continued shortchanging of NSF's educational role, a Congressional favorite slated for one of the smallest percentage increases in the whole NSF budget. Reagan proposed raising NSF by $264 million, but Bush, playing to the grandstands in his budget-revision message, upped the growth figure to $361 million, without identifying where the money would come from. Addressing only the Reagan spending plan for the Foundation, the CRS states: "With the rising Federal deficit, Congress may focus on the proposed 14-percent increase for NSF." The analysis adds that Congress may also look into how NSF plans to fund its newly authorized program for construction and renovation of university laboratories, "and whether support for the SEE (Science and Engineering Education) directorate is increasing rapidly enough."

National Institutes of Health. Presidential budget proposals are by and large irrelevant in the affairs of NIH, which has traditionally thrived under Congressional admiration and protection. But the Congress's esteem for NIH has taken some jolts from Bethesda's indolent response to publicized cases of scientific misconduct. The CRS analysis notes that Congress is "likely to scrutinize... NIH attempts to confront the issue of scientific fraud." The essential point, still poorly recognized by the NIH management, is that their maladroit handling of this issue---which they privately regard as inflated and unimportant---could cost NIH dearly in Congressional confidence. And a loss there, amid the stringencies that confront federal spending, could drain away some Congressional fervor for keeping NIH rich.

Department of Commerce. The main R&D issues here, the CRS analysis points out, are the new responsibilities for industrial competitiveness assigned last year to the Department's National Institute of Standards and Technology (NIST, formerly the National Bureau of Standards) without additional money to finance them. In fact, the $155.6 million that Reagan proposed for NIST for 1990 is $3.5 million below the current budget. Congress, which eyes NIST as a focal point for federal encouragement of industrial R&D, is not likely to tolerate the skimpiness of the budget scheme. But where to get the money remains the big question. It's not likely to come from the National Oceanic and Atmospheric Administration, also in Commerce, which the Reagan budget would cut from $287 million this year to $189 million in 1990. Congress likes NOAA, and has regularly resisted White House attempts to drain its budget.

Department of the Interior. R&D is getting a bigger share of a shrinking Departmental budget, the CRS analysis points out—up from 8 percent in 1989 to a proposed 13 percent in 1990, with half going to the US Geological Survey and most of the balance to the Bureau of Mines and the Fish and Wildlife Service. The Reagan proposal for 1990 would cut the current level of R&D at Interior by 10 percent to $387 million. A major shift, CRS notes, is a near-doubling of USGS funds for research on global change, to a total of $10.3 million.

Environmental Protection Agency. With environment back on the political agenda, Reagan proposed a big increase for R&D supported by EPA, from $386 million in 1989 to $421 next year. The political zest is there, which means that EPA ranks high for benefiting from Congressional juggling with the budget.

Department of Transportation. Overall, Reagan left behind a standstill budget for Transportation, proposing a mere $3-million addition to the $329 million appropriated for this year. The needy one here is the Federal Aviation Administration, which receives 55 percent of the Department's R&D funds. With the air-transportation system suffering geriatric problems, FAA is a good candidate for additional funding.

Job Changes, Appointments

David J. Lipman has been appointed Director of the newly created Center for Biotechnology Information at the National Library of Medicine, part of the National Institutes of Health. Lipman comes to the post from the NIH National Institute of Diabetes and Digestive and Kidney Diseases, where he was a research scientist in the Mathematical Research Branch.

Lowell P. Weicker Jr., a strong NIH supporter while a Republican Senator from Connecticut, will be the Chief Executive Officer of a new organization for promoting public support of science, Research! America, with headquarters in Alexandria, Va. Over $2 million for the next three years is said to have been pledged by the American Medical Association, Upjohn, the National Health Council, the Association of American Universities, Jack Whitehead (a Connecticut businessman and philanthropist) and several health associations. Weicker was defeated in the last election.

William L. Roper, head of the Health Care Financing Administration, in the Department of Health and Human Services, is moving to the White House, where he will be Director of the Office of Policy Development and Assistant to the President for Domestic Policy.

David A. Shirley plans to step down this year as Director of the Lawrence Berkeley Laboratory, and return to research.

Facts on Holiday as SSC Boosters Hit Capitol Hill

The barons of high-energy physics were in Washington last week, teaming up with pork-hungry Congressmen and cheerleaders from the Department of Energy (DOE) to push for a legislative go-ahead for the Superconducting Super Collider (SSC). And the *non sequiturs*, misinformation, and political bids for *quid pro quo* did gush, with a velocity worthy of particle physics.

The setting was a hearing before the House Science, Space, and Technology Committee's Subcommittee on Basic Energy Science and General Science and Research, chaired by Rep. Marilyn Lloyd. Her district includes the Oak Ridge (Tenn.) National Laboratory, which, like the gestating, Texas-bound SSC, lives off the DOE budget. The Committee holds authorizing jurisdiction for DOE, which means that it writes laws and sets budgetary ceilings, but does not dish out money—a function of the Appropriations Committee. But what the SSC desperately needs at this stage is a law saying that there shall be an SSC. In the routine workings of the House, Rep. Lloyd's Subcommittee is the place where such a law starts through the legislative mill.

Calling to order the hearing room, crowded with lobbyists and the usual crowd of science watchers, the gentlewoman from Oak Ridge quickly brought up the topic of the SSC—for which $250 million and an authorization are sought this year. She was worried, she said, about its impingement on other parts of the DOE budget, particularly the Oak Ridge share, since, if approval is granted, SSC spending will rapidly rise to $500 million a year for at least a decade.

"I know that the Department has stated that the SSC would not impact other funding for other important science enterprises," she said. "But in the strained fiscal situation that we find ourselves today, with a need to reduce budget deficits, it's hard for me to believe that even the best intentions of the Department can prevent serious impact on other science programs from a project as large as the SSC."

Rep. Lloyd then proceeded from the abstract to the particular: "For example, at my laboratory in Oak Ridge," she said with a note of possessiveness, "an important new facility, the advanced neutron source, has not been provided the required funding level in the Department's FY 1990 budget request." She added that the frugality extended to the Brookhaven (NY) National Laboratory, for which DOE had not budgeted funds that the Committee had recommended for construction of a heavy-ion collider.

The Chairlady's opening statement was followed by testimony from two Texas Congressmen, Jim Chapman, a member of the Appropriations Committee, whose district, in Dallas County, is not far from the SSC site, and Joe Barton, whose district includes the site. Chapman told the Subcommittee that "we need the authorization bill so bad," because lack of a bill would be a weapon for opponents of the SSC. Furthermore, he said, repeating an argument devised two years ago by DOE's legislative strategists, the authorization is needed to assure potential foreign partners that the US intends to proceed with the project. Once that's in hand, said Rep. Chapman, negotiations can proceed for "hundreds of millions of dollars" in foreign cost-sharing. He did not explain why foreign commitments could not be made contingent upon Congressional approval.

Rep. Barton had even better news for the Subcommittee: "India," he said, "has agreed to $50 million."

India? $50 million to help build the American SSC? A member of the Subcommittee, Harris W. Fawell (R-Ill.), asked the chief DOE witness, Robert O. Hunter, Director of the Office of Energy Research, about the reported contribution from India.

Hunter answered that the US has "received from India a signed agreement for over $50 million."

But the US has received nothing of the sort—a fact that's clearly stated in, of all places, the 39-page statement that Hunter brought to the hearing. As is the custom in these hurried proceedings, the statement was submitted for publication in the record without being read.

Regarding SSC cost-sharing by India, Hunter's text states: "The newly extended Science and Technology agreement with India contains a section on possible collaboration on the SSC. This is a provisional annex for in-kind contributions with a value of $50 million. It is important to note that the Indian agreement is contingent upon a commitment of funds to the project by the US government and the settlement of the remaining issue of intellectual property rights in the umbrella agreement."

SGR asked Hunter to explain "in-kind" contributions, and was referred to James F. Decker, Deputy Director of the DOE Office of Energy Research. Decker said, "They might provide some engineers." Asked if that would be a useful contribution to the SSC, Decker shrugged. Asked if any money had been sent or promised by India, Decker said no, adding, "We don't expect anyone will send money. It will all be in-kind."

Rep. Barton also noted in his testimony that the $250 million sought this year for the SSC is "only two hours worth of federal spending." And, in what was perhaps the most puzzling sentence uttered that day on Capitol Hill, he warned: "If the SSC is not constructed in the United States, future US generations will be forced to buy the technologies of tomorrow from the nations willing to invest in the SSC today."

Hunter was asked at the hearing to place the SSC in the Department's order of priorities, in the likely event that DOE can't have everything it wants. The question is sensible, but it's also politically dangerous, since it automatically jeopardizes items rated low. Accordingly, Hunter dodged behind the artifice of the SSC being "separately budgeted" from other programs. He added that he didn't know of any good way to "prioritize items in the budget."

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PhD Supply and Demand: Warning of Big Shortfall

The following is condensed from "Supply and Demand for Science and Engineering PhDs: A National Crisis in the Making," a talk to the Regents of the University of California, February 16, by Richard C. Atkinson, Chancellor, UC San Diego.

By the early years of the next century, the annual supply of PhDs available to the nation's workforce will be about 10,500 versus a demand for about 18,000. This imbalance will have devastating consequences for colleges and universities and for business and industry.

Currently the country employs approximately 12,500 new PhD scientists and engineers per year—5000 in universities, 6000 in industry, and the rest in federal, state, and local government. Since 1977, an average of about 5500 new PhD positions have been created per year in business and industry. Assuming that number remains constant and taking into account replacement positions due to retirements, non-academic demand for PhDs in the natural sciences and engineering should increase slowly but steadily, growing to about 9500 by the year 2004.

The replacement of retiring faculty in the sciences and engineering will accelerate over the next 15 years, going from a rate of about 2000 per year in 1988 to over 4500 in 2004. Beginning around the year 2000, while colleges and universities are scrambling to fill positions created by faculty retirements, they will suddenly be faced with increased enrollments [from growth of the 18-24-year-old population]. Assuming that the percentage of the college-age group entering college does not change appreciably and assuming current faculty/student ratios, academic demand for new PhD scientists and engineers will almost double between 1988 and 2004 to about 8500 per year.

What about PhD production? The number of PhDs awarded annually in the natural sciences and engineering more than tripled between 1959 and 1971, from slightly over 4000 to about 13,500. Starting in 1971, the number declined to about 11,000 in 1978, and then began a steady increase to about 14,500 for the current year. From 1989 forward, the number of PhDs is projected to decrease more or less steadily until about 2006.

[A factor in the recent growth in degrees is that] the percentage of PhDs awarded to foreign citizens has been increasing in all fields of science and engineering. In 1988, foreign citizens were awarded 30 percent of the PhDs in the physical sciences, 50 percent in mathematics, and 60 percent in engineering. If we assume that PhDs awarded to US citizens persist at the 1986 rate of 2.25 per 1000 30-year-olds, and if we assume that foreign citizens continue to receive 5000 PhDs per year, then we arrive at projections showing a decreasing number starting this year or next, down to a level of slightly more than 12,000 per year by 2004.

Since 5000 of those new PhDs will be granted to non-US citizens, it is certain that not all 12,000 will be available for employment in the US. As working conditions improve in other countries, a decreasing percentage of foreign-born PhDs will remain in the US to make up the shortfall between demand and supply. In combining predictions of supply and demand, one assumption, by NSF, is that 70 percent of the foreign students receiving PhDs will remain in the US. Under these conditions, the shortfall is 7500 per year during the first decade of the next century. If academia were to

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Super Collider

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Hunter and the Congressional witnesses were followed by four panels consisting of the heads or senior staff members of the major DOE research centers—a dozen witnesses crammed into two hours. Among them was Leon M. Lederman, the Nobel laureate Director of the Fermilab, whose prepared text acknowledged the generous treatment of high-energy physics in the 1990 budget, and went on to ask: "In view of the extreme sensitivity of everyone to the overall fiscal austerity, how can anyone dare complain?" Nonetheless, Lederman managed, if not to complain, at least to anguish about finances of the discipline, which, he said, "shores up the cultural end of the structure we call science and plays a crucial role in science education."

The format of distinguished scientists facing their Congressional overseers across a hearing room creates a semblance of communication between science and politics. But, in fact, such encounters are virtually useless for conveying information to the Committee members. Many do not show up at all, while others drift in and out to attend to other business, including hearings of other committees on which they serve. Questions are limited to five minutes. And when the House is in session, hearings are repeatedly interrupted by roll calls which send Committee members scrambling to the House floor, several blocks away.

The real business in these legislative matters, as in most others, is conducted outside the committee room. And, on this count, the backers of the SSC are privately expressing confidence, though they note that the budget stringencies that Congress must cope with later in the session may suddenly entangle their SSC aspirations.

But the word at this point is that three of the four subcommittees whose approval is necessary—subcommittees on appropriations and authorization in each chamber—are lined up for the SSC. Still to be roped in, SGR is advised, is the House Appropriations Subcommittee for Energy and Water Development.

The SSC crowd is working on it.---DSG

. . . A Call for a New Federal Fellowship Program

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recruit successfully all of the PhDs it needed, then there would be a remainder of 2000 to service industry, business, and government needs of 9500. On the other hand, if industry and business were to hire all the PhDs they required, then there would be only 1000 left to meet the academic needs of 8500. The more serious scenario is that neither sector will bear the full brunt of the projected shortfall and that both will have serious shortages.

The top research universities may be able to compete for the best people, although the competition will be acute. Second-tier institutions probably will experience serious difficulties in attracting and holding faculty. To maintain adequate numbers, universities will have to compete in the marketplace for talent. However, a bidding war between industry and academia would serve neither well and would have serious consequences for the nation's economy and defense.

We would have to make very pessimistic assumptions about the economy and/or the national research and education enterprise in order to reduce the projected shortfall for PhDs on the demand side. Therefore, steps need to be taken to increase supply. For example, if, in Fall 1992, 63,000 additional high school seniors were to enter college determined to major in science or engineering, then the number of PhDs derived from that additional cohort would bring the 2004 production level up to the 1988 level. This production level would require that 11,000 additional graduating seniors in science and engineering enter graduate school in the year 1996 rather than seeking immediate employment.

One option that we should pursue immediately is the establishment of a National Fellowship Program for Graduate Students, similar to the National Defense Education Act programs created after Sputnik. The program should provide appropriate incentives for college students considering graduate work: A fellowship of $25,000 per year for four years of study would be a strong attractor for potential PhD students. To deal only with the shortfall in the natural sciences and engineering, at least 3000 fellowships per year would be needed. The cost of such a program at steady state would be $300 million per year. This is a small investment for the United States, given the seriousness of the problem. As the data indicate, the onset of the gap between supply and demand will be rather sudden and will begin to become apparent in about five years. Steps to deal with the shortfall should have been taken years ago. Since we are starting late, our efforts will have to be even more vigorous.

Royalty Income Up at Stanford

Stanford University, a leader in wringing income from academic research, says it received nearly $9.2 million in royalty income last year, a 52-percent gain over the previous year. Next year's take was estimated by Stanford at $11 million, including $4.9 million from recombinant DNA.

The Unheeded Science Advice

The popular thesis of undue scientific influence in the high councils of government must now contend with a situation that is increasingly vexing and embarrassing for the leaders of the scientific community.

From many different forums, and in the clearest possible terms, they advised the presidential candidates last year that early appointment of a Presidential Science Adviser is indispensable to the successful management of the federal government. The advice was volunteered, rather than invited. But there it was, and widely reported in the press.

Candidates Bush and Dukakis seemed to agree, to the extent of stating that they would appoint a science adviser, though neither said when. By the end of February, however, the appointment still had not been made, and the White House Office of Science and Technology Policy (OSTP) remained staffed by the holdover Reagan appointee, William R. Graham, and a skeleton crew, all in the limbo status of having resigned but lingering on, at the new Administration's request, until successors are appointed.

The gap between sermons on science advice and the current political reality is nicely illustrated by the report of one of many groups gratuitously advising the candidates on their advisory needs, the Miller Center Commission on the Presidency and Science Advice, organized by the White Burkett Center of Public Affairs, at the University of Virginia.

After citing a range of responsibilities for the President's Science Adviser, from organizing the OSTP staff to "reviewing and advising on the proposed budgets of the various federal agencies," the report states: "The Commission recommends in the strongest terms that the science adviser be designated and informally begin working on these tasks soon after the election. This means, among other things, that the groups concerned with transition consider, between the time of the convention and the election, persons for the post of Science Adviser.

"It is highly desirable that the science adviser-designate participate in the new President's first message to Congress and in preparing a list of the key issues that must be managed and decided."

The Commission was co-chaired by Brent Scowcroft, who, at the outset of the Bush Administration, was appointed White House National Security Adviser, and Dale R. Corson, President-emeritus of Cornell, and a regular workhorse in science-policy affairs at the National Academy of Sciences.

Members of the Commission included Solomon J. Buchsbaum, AT&T Bell Labs Vice President who chaired the White House Science Council under Reagan; John Deutsch, Provost of MIT, and William D. Carey, former Executive Officer of the American Association for the Advancement of Science.

. . .In Print (Cont.): R&D in US South, W. Germany

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report does note, however, a "bias against low technology," and quotes Everett Welmers, a former Aerospace Corp. executive, as saying that the firm "was often more interested in the technical grandeur of a program than in doing it in a cost-effective way."

Order from: Office of Technology Assessment, International Security and Commerce Program, US Congress, Washington, DC 20510-8025; tel. 202/228-6420.

Science & Technology Trends in the South (48 pp., $10), report by the Southern Technology Council, advisory body of the 12-state Southern Growth Policies Board, details the member states' shares of federal, state, and industrial funds for R&D and education, plus membership on federal advisory committees, rankings of universities, PhDs, etc.

Order from: Southern Growth Policies Board, 5001 S. Miami Blvd., PO Box 12293, Research Triangle Park, NC 27709; tel. 919/941-5145.

Governing America: A Competitiveness Policy Agenda for the New Administration (50 pp., $7), another in the evanescent genre of advice to new Presidents, but this one comes from a group with ample resources and staying power on the Washington scene, the Council on Competitiveness, a large collection of industry and university chiefs, chaired by John A. Young, CEO, Hewlett-Packard, with Paul E. Gray, MIT President, a Vice Chairman. Under a prominent heading of "Science and Technology," the Council calls for a stronger role for Presidential science advice, a two-year funding cycle for federal R&D, close federal attention to industrial R&D needs, more federal money for academic science, and a big role for the Pentagon in assuring national industrial strength.

Order from: Council on Competitiveness, 1331 Pennsylvania Ave. NW, Suite 900, North Lobby, Washington, DC 20004; tel. 202/662-8760.

The Responsible Conduct of Research in the Health Sciences (97 pp., no charge), report from the Institute of Medicine (part of the National Academy of Sciences), commissioned by NIH in quest of advice on how to reduce its vaudevillian mishandling of the scientific-misconduct issue. IOM initially planned to ponder the problem at a secret meeting, but opened the doors when SGR threatened legal action under the Federal Advisory Committee Act (SGR, September 15, 1988, "*Glasnost* Comes to the IOM Meeting on Scientific Fraud"). The IOM report says the burden should be on universities to prevent misconduct by stressing ethical standards, quality rather than number of papers, and establishing clear procedures for investigating charges. The aim of the IOM is to keep out the feds while doing the least necessary to assure the public and Congress that the problem is both minimal and under control.

Order from: Institute of Medicine, Office of Communications, 2101 Constitution Ave. NW, Washington, DC 20418; tel. 202/334-2352.

Technology Policy and Its Effects on the National Economy (240 pp., no charge), from the House Science, Space, and Technology Committee by its ad hoc Technology Policy Task Force, now gone, along with the Task Force Chairman, Rep. Buddy MacKay, who made an unsuccessful run for the Senate in Florida. From deficiencies in education to overspending on defense R&D, the report inventories familiar failings of the American economy.

Order from: Committee on Science, Space, and Technology, Publications Office, 2321 Rayburn House Office Building, Washington, DC 20515; tel. 202/225-6371.

Report of the Federal Government on Research : 1988 (131 pp., no charge), from the West German Ministry for Research and Technology, an abridged version, in English, of its quadrennial report to the Bundestag, describing R&D programs, budgets, manpower, patents, etc., plus comparisons with other countries. The report covers research by government, industry, and private institutes, and also lists the names and addresses of major research organizations.

Order from: Federal Ministry for Research and Technology, Public Relations Division, Postfach 20 02 40, Heinemannstrasse 2, D-5300 Bonn 2, Federal Republic of Germany; tel. 02 28/59-1.

AAU Admits Rutgers, SUNY Buffalo

Rutgers and SUNY Buffalo have been admitted to the limited ranks of the Association of American Universities, bringing membership of the Washington lobby for big research schools to 56 in the US and two in Canada. While many clamor to get in, and thus acquire a big-league aura, few are admitted. The last expansion, in 1985, brought in Brandeis, Rice and the Universities of Florida and Arizona.

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In Print: S&T Data Book, Foreign Technology, Etc.

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Science and Technology Data Book: 1989 (NSF 88-332, no charge, 51 pp.), latest edition of NSF's excellent distillation of the basic numbers and trends in R&D funds, education, jobs, etc. in the US, plus international comparisons—all in one pocket-size booklet that's a must for anyone interested in these matters. Included is a list of the major reports from which the data were taken.

Order from: NSF, Division of Science Resources Studies, 1800 G St. NW, Washington, DC 20550; tel. 202/634-4634.

Congressional Report (mostly monthly, about 40 pp., no charge), little-known outside of Washington science-policy circles, this detailed review is prepared by the NSF Office of Legislative and Public Affairs for the National Science Board, sort of NSF's board of directors. It covers a wide variety of budgetary and legislative matters concerning R&D, education and related subjects---and not just those directly involving NSF. Fascinating for those gripped by the Congressional minutiae of these matters; deadly for others.

Order from: NSF, Office of Legislative and Public Affairs, 1800 G St. NW, Washington, DC 20550; attn: Anna Fotias; tel. 202/357-9730.

Two from the General Accounting Office (GAO), investigative arm of Congress:

AIDS Research: NIH Review Process and Outcome of Applications for Grants and Contracts (GAO/HRD-89-17, no charge, 44 pp.) report of a study requested by Edward Kennedy, Chairman of the Senate Committee on Labor and Human Resources, on who's been getting NIH awards for AIDS research (up from $3.2 million in fiscal 1982 to $468 million in 1988). GAO, indicating it found nothing amiss, says higher ratings were funded at a higher rate than lower ratings, applicants under age 40 fared better than those over 40, prior grantees did better than non-grantees, 26 percent of applications by males and 15 percent by females were disapproved, etc., etc.

Federal Research: Determination of the Best-Qualified Sites for DOE's Super Collider (GAO/RCED-89-18, no charge, 68 pp.), provides no grist for the fading quest for evidence of a "fix" in selection of a Texas site for the Superconducting Super Collider. GAO says the 21-member screening panel, operated by the National Academy of Sciences, was expert and disinterested. Noting that six members were from California, GAO adds that if California had won, the "high percentage. . . could have raised major questions about the appearance of favoritism." GAO's one note of criticism: if more data about desirable regional resources had been provided, four states would have dropped out or chosen other sites, thus possibly saving themselves application costs of $700,000 to $2.4 million.

Order from: USGAO, PO Box 6015, Gaithersburg, Md. 20877; tel. 202/275-6241.

NTIS Foreign Technology Abstract Newsletter (weekly, $125 per year, 30-36 pp.), expanded, revamped version (started last August) of a previous publication of the US National Technical Information Service, this look at technology abroad is designed to reciprocate longstanding foreign surveillance of US technology. Included are reports from US science attaches, foreign-based representatives of the Office of Naval Research, US exchange scientists, and US government monitorings of the foreign press.

Order from: NTIS, 5285 Port Royal Rd., Springfield, Va. 22161; tel. 703/467-4630.

Big Dumb Boosters: A Low-Cost Space Transportation Option? (25 pp., no charge), report from the Congressional Office of Technology Assessment (OTA), based on a December 1987 workshop on minimizing costs through low-technology launch vehicles. The workshop, involving a 23-member panel headed by M. Granger Morgan, Head of the Department of Engineering and Public Policy, Carnegie-Mellon University, concluded that research is needed to determine whether big and dumb is really cheaper. The

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